Claims

1. A human embryonic stem cell line characterised by at least one of the following:

i) presence of the cell surface markers TRA-1-60, GTCM2, and SSEA-4;

ii) expression of *Oct-4*;

iii) expression of *NANOG*;

iv) expression of *REX-1*; and/or

expression of *TERT*.

2. The human stem cell line as claimed in Claim 1 having two or more of the characteristics i) to v).

3. The human stem cell line as claimed in Claim 2 having three or more of the characteristics i) to v).

4. The human stem cell line as claimed in Claim 3 having four of the characteristics i) to v).

5. The human stem cell line as claimed in Claim 4 having all of the characteristics i) to v).

6. The stem cell line hES-NCL1 deposited at NIBSC under Accession No. P-05-001.

7. An embryonic stem cell bank comprising a multiplicity of genetically distinct stem

cell lines as claimed in any one of Claims 1 to 6.

8. A method of screening an agent for toxicity and/or for therapeutic efficacy, said method comprising:

i. exposing a stem cell line as claimed in any one of Claims 1 to 6 to said agent;

ii. monitoring any alteration in viability and/or metabolism of said stem cells; and

iii. determining any toxic or therapeutic effect of said agent.

9. A method of screening an agent for toxicity and/or for therapeutic efficacy, said method comprising:

i. exposing an embryonic stem cell bank as claimed in Claim 7 to said agent;

ii. monitoring any alteration in viability and/or metabolism of said stem cells; and

iii. determining any toxic or therapeutic effect of said agent.

10. A method of producing fibroblast-like cells, said method comprising:

i. providing a stem cell line as claimed in any one of Claims 1 to 6;

ii. allowing cells of said stem cell line to differentiate into stem cell derived fibroblast-like cells.

11. The method of Claim 10 which is conducted without use of a specific stimulant for differentiation.

12. The method as claimed in either one of Claims 10 and 11 wherein the fibroblast-like cells are produced for a therapeutic purpose.

13. A method of culturing cells wherein the fibroblast-like cells obtained as claimed in Claims 10 or 11 act as feeder cells or condition cell culture media used during culture of the cells.

14. The method as claimed in Claim 13 wherein the cells being cultured are stem cells.

15. A method of maintaining the viability of eggs prior to or during fertilisation, wherein the fibroblast-like cells obtained as claimed in Claims 10 or 11 act as feeder cells or condition cell culture media used during maintenance of the eggs.

16. A method of culturing a blastocyst or embryo prior to implantation into a receptive female, wherein the fibroblast-like cells obtained as claimed in Claims 10 or 11 act as feeder cells or condition cell culture media used during culture of the blastocyst or embryo.

17. The fibroblast-like cell line hESCdF-NCL as deposited at ECACC under Accession No. 04010601.

18. A method of culturing cells wherein hESCdF-NCL cells act as feeder cells or condition cell culture media used during culture of the cells.

19. The method as claimed in Claim 18 wherein the cells being cultured are stem cells.

20. A method of maintaining the viability of eggs prior to or during fertilisation, wherein hESCdF-NCL cells act as feeder cells or condition cell culture media used during maintenance of the eggs.

21. A method of culturing a blastocyst or embryo prior to implantation into a receptive female, wherein hESCdF-NCL cells act as feeder cells or condition cell culture media used during culture of the blastocyst or embryo.

22. A self-feeder system for the growth of undifferentiated stem cells, said system comprising:

i. culturing a stem cell line as claimed in any one of Claims 1 to 6; and

ii. and allowing some of the cells of said stem cell line to differentiate into

stem cell derived fibroblast-like cells whilst the remainder of the cells of said embryonic stem cell line remain in an undifferentiated pluripotent, multipotent or unipotent state, whereby said stem cell derived fibroblast-like cells act as autogeneic feeder cells for said stem cells.

23. A method of culturing a blastocyst, said method comprising exposing said blastocyst for a period of at least 12 hours to Buffalo rat liver cells or to media conditioned by Buffalo rat liver cells.

24. The method as claimed in Claim 23 wherein the period of exposure is at least 48 hours.

25. The method as claimed in either one of Claims 23 and 24 wherein the period of exposure of said blastocyst to said Buffalo rat liver cells or to media conditioned by said Buffalo rat liver cells immediately precedes extraction of ICM cells from the blastocyst.

26. The method as claimed in any one of Claims 23 to 25 wherein the media conditioned by Buffalo rat liver cells is produced by:

i. culturing at least 75000 Buffalo rat liver cells/cm^2 in Glasgow medium for 24 to 36 hours; and

ii. recovering the media by removal of the cells.

27. The method as claimed in any one of Claims 23 to 26 wherein the blastocyst can be cultured to day 8 after fertilisation and retain pluripotency.

28. The method as claimed in any one of Claims 23 to 27 wherein said blastocyst is a primate blastocyst.

29. The method as claimed in Claim 28 wherein said blastocyst is a human blastocyst.

30. A method for culturing a blastocyst, as claimed in any one of Claims 23 to 29, said method comprising:

i. culturing said blastocyst from fertilisation in G1 media;

ii. transferring said blastocyst of step i) to G2.3 media and maintaining said blastocyst in the G2.3 media; and

iii. transferring said blastocyst of step ii) to cell culture media conditioned by Buffalo rat liver cells.

31. The method as claimed in Claim 30 wherein the blastocyst is cultured in the conditions of step i. for 1 to 3 days.

32. The method as claimed in either one of Claims 30 and 31 wherein the blastocyst is cultured in the conditions of step ii. for 2 to 3 days.

33. The method as claimed in any one of Claims 30 to 32 wherein the blastocyst is cultured in the conditions of step iii. for 1 to 3 days.

34. The method as claimed in any one of Claims 30 to 33 wherein the cell culture media is Dulbecco's modified Eagle's medium optionally supplemented with 15% (v/v) Glasgow medium and conditioned by Buffalo rat liver cells.

35. A method of *in vitro* fertilisation, said method comprising culturing a blastocyst as claimed in any one of Claims 23 to 34; and implanting said cultured blastocyst into a receptive female.

36. A method of producing an embryonic stem cell line, said method comprising:

i. culturing a blastocyst as claimed in any one of Claims 23 to 34; and

ii. extracting cells of the inner cell mass (ICM) from said blastocyst and culturing the cells to produce an embryonic stem cell line therefrom.

37. The method as claimed in Claim 36 wherein said stem cell line is a primate embryonic stem cell line.

38. The method as claimed in Claim 37 wherein said stem cell line is a non-human primate embryonic stem cell line.

39. The method as claimed in Claim 37 wherein said stem cell line is a human embryonic stem cell line.

40. The method as claimed in any one of Claims 36 to 38 wherein said embryonic stem cell line is a pluripotent stem cell line.

41. A self-feeder system for the growth of undifferentiated stem cells, said system comprising:

i. culturing a blastocyst as claimed in Claims 23 to 34;

ii. extracting cells of the ICM from said blastocyst and culturing the cells to produce an embryonic stem cell line therefrom; and

iii. and allowing some of the cells of said embryonic stem cell line to differentiate into stem cell derived fibroblast-like cells whilst the remainder of the cells of said embryonic stem cell line remain in an undifferentiated pluripotent, multipotent or unipotent state, whereby

said stem cell derived fibroblast-like cells act as autogeneic feeder cells for said stem cells.

42. An embryonic stem cell bank comprising a multiplicity of genetically distinct stem cell lines obtained by the method as claimed in any one of Claims 36 to 39.

43. A method of producing fibroblast-like cells, said method comprising:

i. culturing a blastocyst as claimed in any one of Claims 23 to 34;

ii. extracting cells of the ICM from said blastocyst and culturing the cells to produce an embryonic stem cell line therefrom; and

iii. allowing cells of said embryonic stem cell line to differentiate into stem cell derived fibroblast-like cells.

44. A method of culturing cells wherein the fibroblast-like cells obtained by the method of Claim 43 act as feeder cells or condition cell culture media used during culture of the cells.

45. A method of maintaining the viability of eggs prior to or during fertilisation wherein the fibroblast-like cells obtained by the method of Claim 43 act as feeder cells or condition

cell culture media used during maintenance of the eggs.

46. A method of a blastocyst or embryo prior to implantation into a receptive female wherein the fibroblast-like cells obtained by the method of Claim 43 act as feeder cells or condition cell culture media used during culture of blastocyst or embryo.